

**WATER LEVEL MEASUREMENT USING**



**ULTRASONIC SENSOR**

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## **STATEMENT OF AWARD FOR DEGREE**

### **1. Bachelor of Engineering Technology**

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### **SUPERVISOR'S DECLARATION**

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## ABSTRACT

In recent years, natural disaster specifically flash flood have frequently caused major properties damage and life casualty, due to unconscious of rapid water level rising in the flood prone area. A water level monitoring system, is a crucial component that can prevent the unawareness during monsoon season, a real-time alerting system equipped with range sensor and audio visual mechanism possibly will be the solution for this problem. This project proposed an idea for the application for public interest to measure the escalation of water level by using ultrasonic sensor. The sensor is placed vertically to the lateral water surface connected to the ultrasonic sensor controlled by microcontroller to measure the distance of the water. Whenever the water reach certain level, the ultrasonic sensor will transmit the signal and the level is calculated using an appropriate formula.

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## LIST OF ABBREVIATIONS

<b>DC</b>	Direct current
<b>DSP</b>	Digital Signal Processor
<b>EPDM</b>	Ethylene Propylene Dyne Monomer
<b>HDPE</b>	High-Density Poly Ethylene
<b>LDPE</b>	Low-Density Poly-Ethylene
<b>LED</b>	Light Emitting Diode
<b>NBR</b>	Buna N. Acrylonitrile Butadiene
<b>NC</b>	Normally Closed
<b>NO</b>	Normally Open
<b>PET</b>	Polyethylene Terephthalate
<b>PLA</b>	Poly Lactic Acid
<b>PMMA</b>	Poly (methyl methacrylate)
<b>PP</b>	Polypropylene
<b>PS</b>	Polystyrene
<b>PTFE</b>	Polytetrafluoroethylene
<b>PVC</b>	Polyvinyl Chloride
<b>SMS</b>	Short Message System
<b>ToF</b>	Time of Flight
<b>US</b>	Ultrasonic
<b>USB</b>	Universal Serial Bus
<b>UV</b>	Ultraviole

## **CHAPTER 1**

### **PROJECT BACKGROUND**

#### **1.1 PROJECT BACKGROUND**

Recently, drastic climate changes effected from thinning of ozone layer causing the melting of polar ice cap has raised the sea level that leads to weather abnormality. Abnormality such as mega hurricane that caused billions of dollars in property damage and thousands of life casualties has struck few nations of the world. Flash floods is one of the minor abnormality that also caused damage to the publics, but the impact is rather preventable. As the name given flash flood comes rapidly without any signs, if the flood struck during the time humans in the most vulnerable state the probability of casualty is considered highly plausible.

Hence, the objective of this project is to create a complete system that provide an alert for the locals living in the flood prone area. The system alert consist of three aspects alerting through visual alerts audible alerts and close proximity alert (i.e. smartphone through SMS).

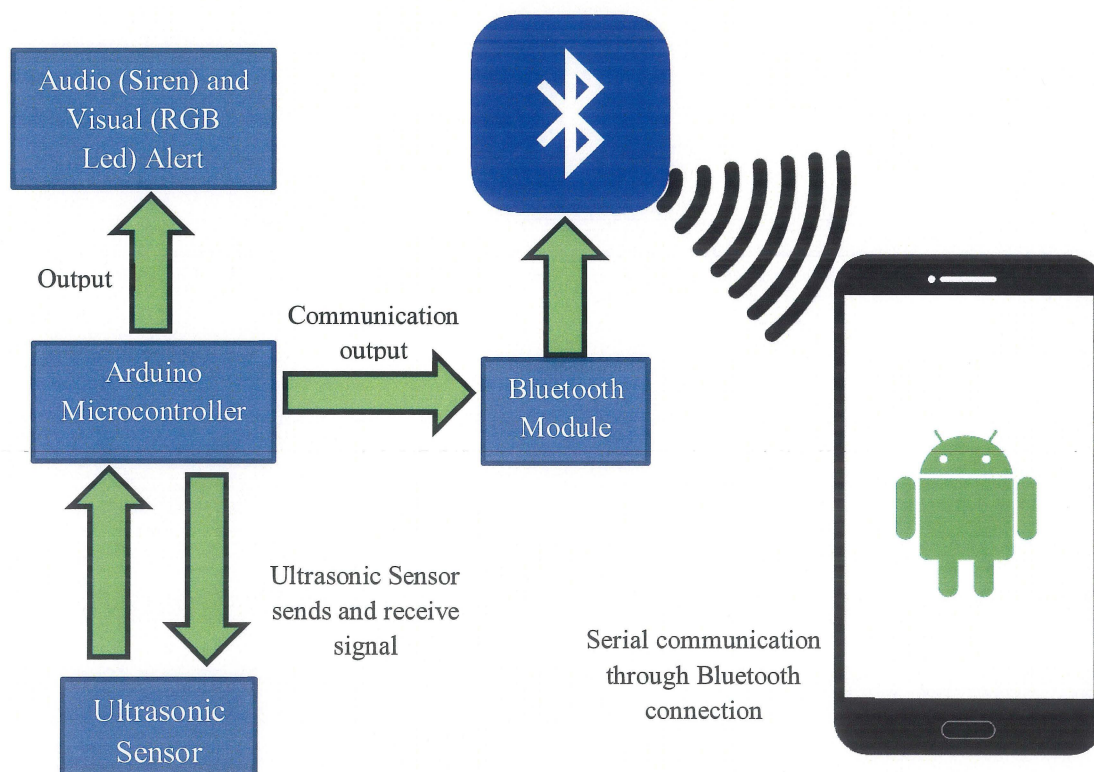
With the changing of the technologies, the production plant especially in the food industries will have to begin developing critical methods to improve the idea of making the production process going really fast and efficient. Our country has also been involving greatly in the production of the liquid packaging whereby the liquid level controller is a must have item in the system. The liquid level controller is not just limited to food industries but they are also widely used in many other sectors where liquid level control is involved. The industrial applications include liquid-level sensing in transport tanks, storage tanks and water treatment tanks, and also in the petrochemical industries for sensing liquids such as petrol, diesel and other fuels. Besides that, liquid level measurement is also used in household applications including electronic devices such as, water dispensers, water evaporators, steamers, heating systems, washing machines, steam irons, juice squeezers and automated-coffee machines.

**Table 1.1:** Application of the liquid level controller in various sectors

Application	Material	Resistance (Ohms)
Agricultural	Ammonium Nitrate	18 K
Dairy Equipment	Milk	1 K
Material Handling	Cement Slurry	5 K
Food & Cooking Equipment	Corn Syrup Cake Batter	45 K 5 K
Pumping Equipment	Fresh Water Salt Water	5 K 2.2K
Vending Equipment	Coffee Fruit Juice	2.2 K 1 K
HVAC/R	Condensate Water	18 K

There has been a huge success where many liquid level controller devices are developed and each of them has different characteristics which allow them to be used in different kind of situation. Liquid level sensors are generally defined as the sensor used for detecting level of liquids or interfaces between liquids such as solids and liquids or water and oil. They are also known as a transducers or integrated systems with instrumentation control capabilities. This kind of sensor plays an important role in several of industries and also consumer applications. Some level controller sensor measurement systems are made to adhere with various parameters such as wide range of applications, high accuracy needs, and system installation requirements and practices.

The approach here is to apply the ultrasonic sensor to control and measure the level of the liquid. The liquid level controller is an ideal solution for liquid level problems in dangerous locations such as the sewage, waste water, chemical and ground water pump. Hence, the designation of an improved system of water level controller is necessary to achieve the target. The general operation of the liquid level controller using ultrasonic sensor starts where the controller sends electric or pneumatic signals to the local control system, main control system or to the automated control valve directly. They are used for controlling the level of liquids in the applications of industrial refrigeration like liquid separators, flood evaporators and intermediate receivers. The controller communicates with the transmitter which measures the level of liquid continuously in the reservoirs. They are ideal for both non-conductive liquids such as oil or diesel and conductive liquids such as water. This project is intended to invent a liquid level controller for appropriate needs that might be useful for industrial and consumer's needs.



*Figure 1.1: A water level measuring system*



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